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THE BUFFERING PROPERTIES OF KERATIN SCRAPINGS.

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THE power to act as a buffer is widely believed to be a natural protective property of the skin, valuable especially against alkaline substances. Burckhardt's (1935, 1954) five minute test is used as a method of measuring this ability. When this test is performed in different sites on the same subject, the neutralizing time varies according to the site chosen for testing, being longest on the flexor aspect of the forearms, a little shorter on the extensor aspect and much shorter on the palm or sole. As one of the differences between the skin in these sites is the thickness of the horny layer it was decided to measure the buffering ability of the horny layer *in vitro*.

MATERIAL AND METHODS.

It was found possible by scraping the skin of the legs below the knee with a scalpel to remove 100 mg., and often more, of the horny layer from one subject, in the form of a fine powder. These keratin scrapings were desiccated *in vacuo* over anhydrous calcium chloride. Aqueous extracts of the desiccated scrapings were made by mixing weighed amounts with distilled water in conical flasks and leaving them in a refrigerator for 48 hours with frequent shakings during this period. The suspensions were then filtered through Whatman's No. 1 paper and the keratin residues on the filter paper were washed with distilled water until the filtrate reached the desired volume. The keratin residues on the filter paper were then washed into beakers with the desired volume of distilled water. Each specimen of keratin scrapings was in this way divided into a water soluble fraction and an insoluble suspension.

The water extracts of keratin scrapings and the washed keratin residues were titrated by adding sodium hydroxide or sulphuric acid. After each addition of acid or alkali the pH was measured with a Cambridge pH meter and glass electrode. Both the water extracts and suspensions of washed keratin residue were stirred continuously with a magnetic stirrer during the titrations. After the addition of acid or alkali, the water extracts of keratin scrapings reached their new pH almost immediately. The suspensions of washed keratin residues took an appreciable time

to reach their new pH but most of the pH change occurred within the first 3-4 minutes. An arbitrary limit of 5 or 10 minutes was set before reading the pH and proceeding to the next addition of acid or alkali.

Amino-acid nitrogen estimations on the water extracts of keratin scrapings were performed by the β naphthoquinone, 4-sulphonic acid method (Frame, *et al.*, 1943; Russell, 1944; Hawk, Oser and Summerson, 1947). The colorimetric estimations were made with a Hilger Spekker absorptiometer with a 603 filter.

Amino acids in the water extracts of keratin scrapings were identified by paper chromatography.

RESULTS.

Experiment 1.

800 mg. of pooled keratin scrapings were collected from 12 subjects and divided into two equal parts of 400 mg. Water extracts from each specimen were made up

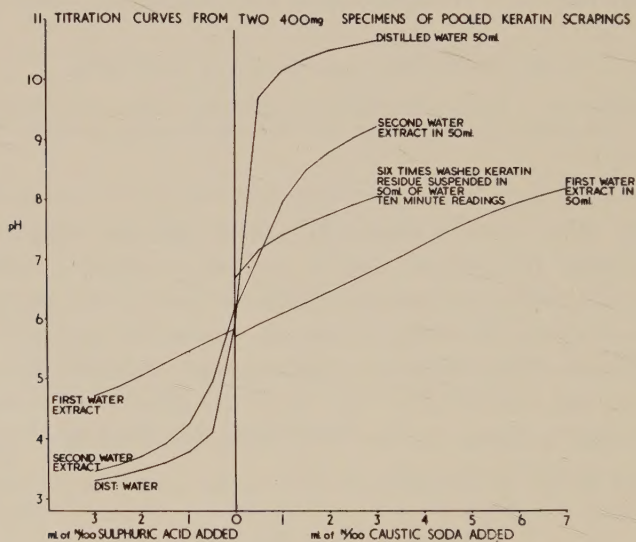


FIG. 1.

to 50 ml. and one was titrated with 0.01 N sodium hydroxide and the other with 0.01 N sulphuric acid. Second water extracts of 50 ml. were prepared from each specimen and titrated with the same strengths of sodium hydroxide and sulphuric acid. One of the specimens was washed and filtered four more times, making a total of six washings and the residue was suspended in 50 ml. of water and titrated with 0.01 N sodium hydroxide; an interval of 10 minutes was allowed between each addition of sodium hydroxide.

The results of these titrations are shown in Fig. 1. The filtrate from the first water extract of the keratin scrapings is seen to buffer against acid and alkali. The second water extract is very much less effective in its buffering ability against acid and alkali. The washed keratin residue buffers against alkali but not so effectively as the first water extract.

Experiment 2.

A further 100 mg. of pooled keratin scrapings were extracted with water and the filtrate made up to 12 ml. This was titrated with 0.1 N sodium hydroxide. The

residue was rewashed and then suspended in 12 ml. of distilled water and titrated against 0.1 N sodium hydroxide, 5 minutes being allowed between each addition.

The results of these titrations are seen in Fig. 2. They are qualitatively the same as in Experiment 1 but the stronger sodium hydroxide which was used enabled the buffering ability over a wider pH range to be tested.

Experiment 3.

Amino-acid nitrogen estimations were performed on 7 separate occasions on water extracts from 9 samples of a pool of keratin scrapings derived from 20 subjects. Further amino-acid nitrogen estimations were performed on water extracts from 15 individual samples of keratin scrapings. In all cases, 25 mg. of desiccated keratin scrapings were extracted with 60 ml. of distilled water.

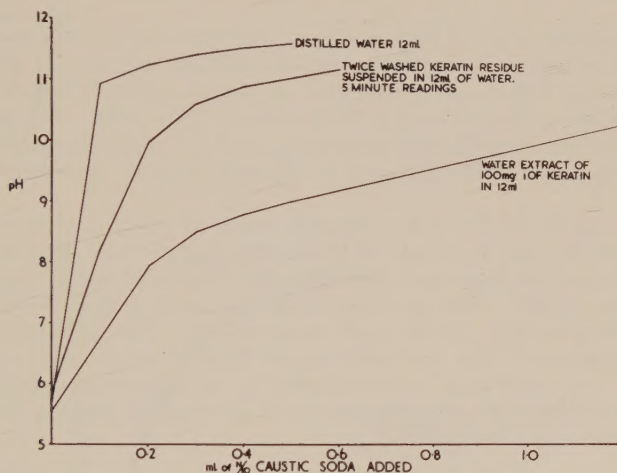


FIG. 2.

The results of amino-acid nitrogen estimations on samples of the same pooled keratin scrapings ranged from 1.68 to 1.88 mg. of amino-acid nitrogen per 100 mg. of keratin scrapings (Table I). The error of the method is ± 0.1 mg. Assuming an average molecular weight of 120, this figure represents about 15 mg. of free amino acid per 100 mg. of keratin scrapings. Results of amino-acid nitrogen estimations on the 15 individual samples of keratin scrapings varied between 0.82 and 2.31 mg. of amino-acid nitrogen per 100 mg. of keratin scrapings (Table II).

TABLE I.—Free amino-acid nitrogen estimations, performed on 7 occasions, on water extracts of 9 specimens from pooled collection of keratin scrapings derived from 20 subjects. Results given in mg. of amino acid nitrogen per 100 mg. of keratin scrapings.

Occasion.	Result.
1 . . .	1.68
2 . . .	1.81
3 . . .	1.88
4 . . .	1.88
5 . . .	1.81
6 . . .	1.72
7 . . .	1.80
	1.76
	1.69

TABLE II.—*Free amino-acid nitrogen estimations performed on water extracts of fifteen individual samples of keratin scrapings. Results given in mg. of amino acid nitrogen per 100 mg. of keratin scrapings.*

Sample.	Result.	Sample.	Result.
1 . . .	2.16	9 . . .	1.22
2 . . .	1.74	10 . . .	1.50
3 . . .	1.48	11 . . .	1.92
4 . . .	1.57	12 . . .	2.30
5 . . .	1.27	13 . . .	2.31
6 . . .	2.31	14 . . .	1.76
7 . . .	1.72	15 . . .	0.82
8 . . .	1.78		

Experiment 4.

Six of the 15 samples used in Experiment 3 were selected because they showed wide differences in their amino-acid nitrogen levels. Water extracts of 100 mg. of each desiccated sample of keratin scrapings were prepared and each filtrate was made up to 15 ml. These were titrated with 0.05 N sodium hydroxide. The keratin residues were rewashed and each residue was suspended in 15 ml. of distilled water and titrated with 0.05 N sodium hydroxide allowing 10 minutes between each addition of sodium hydroxide.

The buffering curves of the water extracts from six individual samples of keratin scrapings are seen in Fig. 3. A pH of 6.2 is the lowest which is common to all six titrations and the graphs have been drawn so that they all pass through pH 6.2 when no soda has been added. This has been done to enable a visual comparison of the slopes, or buffering ability, to be made more easily. The appropriate amino-acid nitrogen concentration in mg. per 100 mg. of keratin scrapings is shown by each titration curve. The buffering ability is seen to be proportional to the amino-acid nitrogen concentration. The titration curves of the washed keratin residues are seen in Fig. 4. They do not differ materially.

Experiment 5.

The amino acids in water extracts of 30 individual samples of keratin scrapings have been identified. The subjects and patients ranged from age 10 to 70 years and had a variety of skin disorders as listed below.

Alopecia areata	2	Eczema, atopic	1	Pompholyx	1
Acne vulgaris	1	Eczema, seborrhoeic	4	Psoriasis	5
Acrocyanosis and asteatosis	1	Eczema, unclassified	3	Rosacea	1
Boils, recurrent	1	Facial erythema	1	Sycosis barbae	1
Dermatitis, housewife's	2	Ichthyosis	2	Warts	4
Dermatitis, parapsoriasis-like	1	Pityriasis lichenoides	1		

In all cases the keratin samples were collected from skin which was not affected by the disease. In all the samples 25 mg. of keratin scrapings were extracted with 1–2 ml. of distilled water and 80–100 μ l. of the filtrate were applied to the filter paper for chromatography. The extracts from 9 of the samples were concentrated by evaporation on a watch glass at room temperature to see whether amino acids present perhaps in very small quantities would be revealed in the chromatograms. Specimens from 5 of the extracts were treated with hydrogen peroxide and ammonium molybdate before the chromatograms were performed, to detect cystine.

The amino-acid pattern in all the specimens was the same (Fig. 5). The amino acids present are aspartic acid, glutamic acid, glycine, α alanine, citrulline, proline, histidine, leucine, valine, tryptophane, tyrosine, threonine, serine and three others—probably ornithine, lysine and arginine. No variation has been found in different subjects except the occasional absence of histidine and tryptophane which show rather faintly in all specimens. Concentration of the specimens failed to reveal any other

amino acids except histidine when this was absent from the unconcentrated specimen. Cystine was not found.

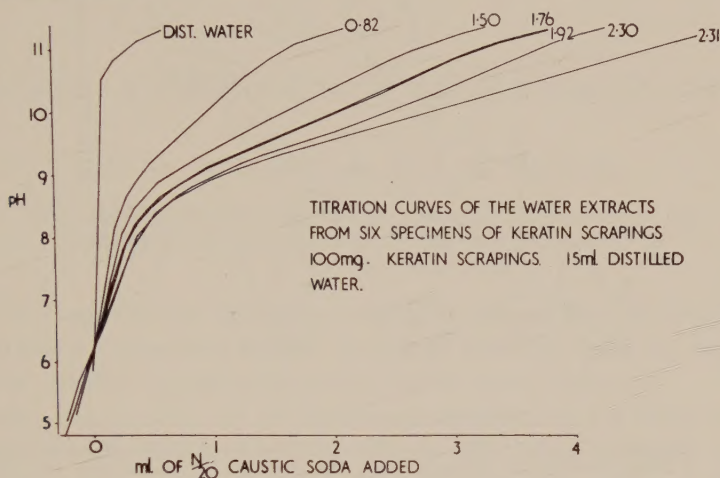


FIG. 3.

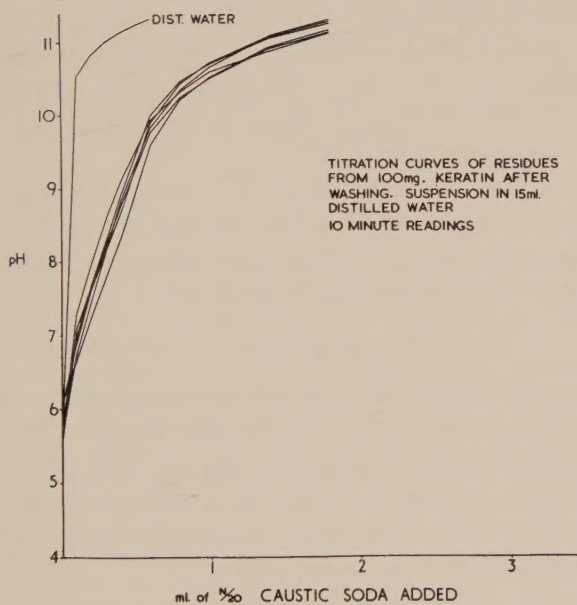


FIG. 4.

DISCUSSION.

The water extracts of keratin scrapings contained a large quantity of free amino acids. The total quantity of free amino acids in different specimens varied considerably but the amino acids present were qualitatively the same in all the specimens examined. The water extracts were found to be effective buffers against both acid and alkali and the buffering ability correlated well

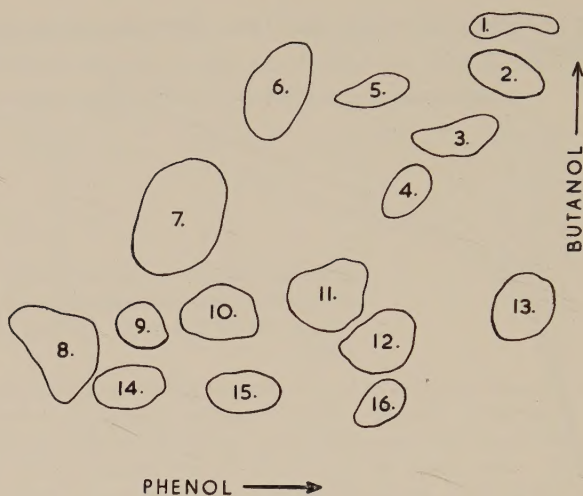


FIG. 5.—1. Tryptophane, 2. leucine, 3. valine, 4. histidine, 5. tyrosine, 6. threonine, 7. serine, 8. aspartic acid, 9. glutamic acid, 10. glycine, 11. α alanine, 12. citrulline, 13. proline, 14. ornithine, 15. lysine, 16. arginine.

with the total amino-acid nitrogen content. The buffering ability of suspensions of the insoluble washed keratin residues did not differ materially from each other. Other substances have been identified in the keratin scrapings, for example a trace of soluble protein, a trace of ammonia, urea, phosphate, lactic acid and sodium, potassium and chloride.

It seems probable that the buffering ability of keratin scrapings is due to the presence of free amino acids and to a lesser extent of insoluble kerato-protein. The traces of other substances would be more likely to influence the starting pH of the titration curves rather than their slope.

SUMMARY.

When alkali or acid was added to a water extract of keratin scrapings the extract behaved as a buffer. Amino acids were found to be present in considerable concentrations in the water extracts and were identified and found to be the same in all specimens of keratin scrapings which were examined. The amino-acid nitrogen concentration varied considerably in different specimens and this correlated with buffering ability.

The washed keratin residues also acted as buffers but were less effective than the water extracts. Specimens from different subjects did not differ materially in their buffering ability.

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THE SOURCE OF FREE AMINO ACIDS IN KERATIN SCRAPINGS.

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It has been shown that free amino acids are present in considerable concentration in water extracts of keratin scrapings collected from the leg (Dowling and Naylor, 1960a). Possible sources of these amino acids are :

(i) Sweat. Amino acids are thought to be present in sweat in about the same concentration as in blood, or a little lower. The sweat secreted on the skin surface might soak into the keratin and there be concentrated by evaporation.

(ii) The hydrolysis of kerato-protein. This is unlikely as kerato-protein is extremely resistant to acid and alkaline hydrolysis.

(iii) The protein of the epidermal cells.

Experiments have been performed in an attempt to obtain evidence as to which of these is the source of the amino acids.

MATERIAL AND METHODS.

Keratin scrapings were collected from human legs, desiccated and weighed. Water extracts were prepared by methods already described (Dowling and Naylor, 1959a). The chloride concentration in water extracts of keratin scrapings was found to be extremely small and could not be measured by conventional methods. The method adopted was visual comparison between the precipitates produced by acid silver nitrate in extracts of the scrapings and standard solutions. It was then possible to say that the chloride concentration was less than a certain figure. Sodium concentrations in the water extracts were measured by flame photometry. Amino-acid, nitrogen concentrations in the extracts were measured by the β naphthoquinone, 4-sulphonic acid method as before. The colorimetric estimations were made using a Hilger Spekker absorptiometer with a 603 filter. The concentrations of soluble protein in water extracts of keratin scrapings were compared by inspection of the precipitate produced by trichloroacetic acid in paired specimens from each patient in Experiment 4.

RESULTS.

Experiment 1.

Fifteen individual specimens of keratin scrapings were collected and in each case 25 mg. of the desiccated specimen was extracted with 60 ml. of distilled water. The concentrations of amino-acid nitrogen, chloride and sodium were measured in each of the extracts and are shown in Table I. The amino-acid nitrogen levels have already been reported (Dowling and Naylor, 1959a).

TABLE I.—*Amino-acid nitrogen, sodium and chloride concentrations in water extracts of fifteen individual samples of keratin scrapings. Amino acid nitrogen given in mg. per 100 mg. of keratin scrapings. Sodium and chloride given in mEq. per 100 mg. of keratin scrapings.*

Sample.	Amino-acid Nitrogen.	Sodium	Chloride.
1 . . .	2.16 .	0.07	} Between 0.024 and 0.048
2 . . .	1.74 .	0.17	
3 . . .	1.48 .	0.07	
4 . . .	1.57 .	0.04	
5 . . .	1.27 .	0.07	
6 . . .	2.31 .	0.05	} Less than 0.024
7 . . .	1.72 .	0.04	
8 . . .	1.78 .	0.04	
9 . . .	1.22 .	0.04	
10 . . .	1.50 .	0.07	
11 . . .	1.92 .	0.05	
12 . . .	2.30 .	0.04	
13 . . .	2.31 .	0.04	
14 . . .	1.76 .	0.05	
15 . . .	0.82 .	0.03	

Experiment 2.

Individual specimens of keratin scrapings from 6 subjects were collected and during the collection, separation of superficial from deep scales was made by putting the first scrapings into one container and the rest in another. Water extracts were prepared using 25 mg. of the desiccated scales and 60 ml. of distilled water. The concentration of amino-acid nitrogen was measured in each of the extracts.

Amino-acid nitrogen concentrations in the water extracts from superficial and deep keratin scrapings are shown in Table II. In 5 out of 6 cases the concentration in the deep scrapings was significantly higher than in the superficial scrapings.

TABLE II.—*Amino-acid nitrogen concentrations in water extracts of superficial and deep keratin scrapings. Results given in mg. of amino-acid nitrogen per 100 mg. of keratin scrapings.*

Case.	Superficial.	Deep.
1 . . .	0.97 .	1.13
2 . . .	1.21 .	1.80
3 . . .	1.28 .	1.83
4 . . .	0.91 .	2.10
5 . . .	1.49 .	1.75
6 . . .	1.07 .	2.07

Experiment 3.

Keratin scrapings were collected from both legs of a patient who had recently had bilateral lumbar sympathectomy and also from 3 patients who had recently had unilateral lumbar sympathectomy. Water extracts were prepared using 25 mg. of each desiccated specimen and 60 ml. of distilled water and the amino-acid nitrogen concentration in each of the extracts was measured.

Amino-acid nitrogen concentrations in the water extracts from keratin scrapings collected from the patients with lumbar sympathectomies are shown in Table III. In the patient with bilateral sympathectomy, the concentration was one of the highest found and in the patients with unilateral sympathectomy the concentrations on the two sides did not differ significantly.

done on two of the subjects and three on the third. Water extracts of the samples were prepared using 25 mg. of desiccated scales and 60 ml. of distilled water. The concentration of amino-acid nitrogen was measured in each of the extracts.

The amino-acid nitrogen concentrations in the water extracts of keratin scales which were collected at increasing intervals after bathing are shown in Table V. The concentration was lowest immediately after bathing, increased to about 2.0 mg. per 100 mg. of keratin scrapings in 10-14 days and was never found to increase above $2.3 \text{ mg.} \pm 0.1$.

DISCUSSION.

The approximate concentrations of sodium and chloride in sweat are known and therefore measurements of the sodium and chloride levels in water extracts of keratin scrapings should be a measure of the contamination of the scrapings by sweat.

Table I shows that the sodium and chloride concentrations in water extracts of the keratin scrapings were low and therefore that there was little contamination of the scrapings by sweat. The contribution of sweat to the amino acids present in the keratin scrapings would therefore seem to be small. For example, 100 mg. of keratin scrapings contain 1.6 mg. of amino-acid nitrogen and 0.024 mEq. of chloride. If this chloride comes from sweat containing 50 mEq. of chloride per litre, approximately 0.5 ml. of sweat would be required. Itoh (1952) found the highest concentration of amino-acid nitrogen in sweat from the lower leg was 5.1 mg. per 100 ml., and 0.5 ml. of sweat would contain 0.025 mg. of amino-acid nitrogen. On this evidence, therefore, sweat would only contribute 0.025 of a total of 1.6 mg. of amino-acid nitrogen.

This argument is supported by the amino-acid nitrogen concentrations in the water extracts of keratinous scales collected from the four patients who had had lumbar sympathectomies performed and whose legs were clinically anhidrotic. The patient with bilateral sympathectomy had an amino-acid nitrogen concentration of 2.3 mg. per 100 mg. of keratin scrapings, which is one of the highest found. The patients with unilateral sympathectomy had levels of amino-acid nitrogen which did not differ significantly on the two sides.

If sweat were a major contributor to the free amino acids, as it is discharged on the skin surface and soaks into the keratin layer, it might be expected that a gradient would be established and the superficial keratin layers would contain more free amino acids than the deeper keratin layers. This might also be the case if the amino acids were formed by hydrolysis of the kerato-protein. Table II shows that the opposite was found and the superficial keratin layer contained less free amino acids than the deeper keratin layer in the cases which were examined in this way. This observation suggests that the amino acids are supplied from below and not from above and the protein of the epidermal cells seems to be a likely source.

Supportive evidence for this view was obtained from the amino-acid nitrogen concentrations in water extracts of imperfectly keratinized scales, i.e. para-

keratotic scales collected from patients with psoriasis. Table IV shows that water extracts of parakeratotic scales contained less free amino acids than extracts of normal scales collected from the same patient. Furthermore, water extracts of parakeratotic scales contained more soluble protein than the extracts of the normal scales collected from the same patient.

There is an inverse relationship between the amount of soluble protein and the amount of free amino acids in the water extracts of normal and imperfectly keratinized scales. This suggests that the amino acids represent the portion of the cellular protein which is not required for the synthesis of kerato-protein. Cystine, which is an important constituent of kerato-protein was not found in chromatograms (Dowling and Naylor, 1959a) and is presumably not discarded during keratinization.

Table I shows that the amino-acid nitrogen concentrations in individual samples of keratin scrapings varied from 0.82 to 2.31 mg. per 100 mg. Table V shows that the variation of amino-acid nitrogen concentration in each of the three subjects on different occasions was as large and that the concentration depended on the time which had passed since the subject bathed. Furthermore, the difference in amino-acid nitrogen concentration between the three subjects disappeared when the subjects did not bathe and all three became stationary at a concentration of 2.3 ± 0.1 mg. per 100 mg. of keratin scrapings.

Although Table V is only derived from three subjects these results are provisionally interpreted as follows. The free amino acids are produced as a by-product of keratinization and the ratio of amino acids to keratin scales is constant. Bathing results in the soluble amino acids being extracted from the horny layer and their concentration falls. The concentration of amino acids rises again as the water extracted horny layer is shed and replaced by newly formed horn from below. The time taken for the concentration of amino acids to rise should therefore be related to the rate of keratin shedding and new keratin formation. The results suggest that the time taken for replacement of the keratin layer is very approximately fourteen days.

SUMMARY.

The evidence concerning the origin of the free amino acids found in keratin scrapings, although indirect, suggests that they originate from epidermal cellular protein and not from sweat or from the hydrolysis of kerato-protein.

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THE EFFECT OF AGE ON THE pH OF THE SKIN SURFACE IN THE FIRST WEEK OF LIFE.

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AN ASSOCIATION between the pH of the skin surface and age, during the first week of life, has recently been demonstrated by Behrendt and Green (1958). They made pH determinations at three body sites, shoulder, axilla and abdomen, by a colorimetric method (Bernstein and Herrman, 1942), on some two hundred children who had no skin disorders. They concluded, from comparisons between groups of children of different ages, that during the first two days of life about fifty per cent. of infants have "abnormally alkaline" reactions although later this proportion decreases so that by the end of the first week of life most infants have a "normally acid skin pH". Their basic data were presented in the form of a scattergram showing the frequency distribution of all pH determinations made on children of specified ages. From this it was obvious that there was a preponderance of determinations of 6.0 pH units or more, with many over 7.0 pH units, on the first day of life. Moreover much of the implied fall in pH during the first week of life occurred during the first three days. Determinations repeated daily on a few children confirmed the conclusions drawn from comparisons between age agroups.

We made detailed reference to this interesting study when describing an experiment on 203 children in Northern Ireland (Beare, Cheeseman, Gailey, Neill and Merrett, 1959). Our children were all in their first week of life and none had skin disease. On each child we made pH determinations with a Marconi direct reading pH indicator at thirty-four body sites spread over the whole body surface. Our main interest was in the variation in the reactions between sites, but in passing we showed that sex played no part in determining pH levels and that the age influence, published by Behrendt and Green after our experiment was finished, did not invalidate our conclusions about the average differences between sites. Our records included a note of the day of life at which each child was examined and, because we have determinations made at many more body sites, they can be used to see if the changes in pH levels with age at the axilla, shoulder and abdomen also occur at other surfaces of the body. This investigation seems worth while because the only other relevant work (Taddei, 1935) suggests that high pH values are maintained by infants for

about three weeks after birth. The 203 children in our series can be considered in eight age groups according to the day of life on which they were examined. No distinction between the sexes is necessary in view of our earlier finding that mean pH levels for boys and girls are similar at all sites. In what follows a result is described as significant if it is unlikely to arise by chance more than once in twenty trials (i.e. $P < 0.05$).

Table I shows the appropriate analysis of variance for estimating the significance of the differences between means of pH determinations on children in different age groups and the significance of the interaction between age and site examined. The significant differences between site means, also shown by the analysis, have been fully discussed elsewhere (Beare *et al.*, 1959) and will not be reconsidered here. Table I indicates significant differences between the age groups so the mean pH for each age is shown in Table II where the standard errors of the means are based on the residual mean square between subjects (9.5003 in Table I). This is justified because the variances within the eight age groups are similar (Bartlett's, 1937, test for the homogeneity of variances gives $0.50 > P > 0.30$).

TABLE I.—*Analysis of Variance of 6,902 pH Determinations.*

Source of variation.	Sum of squares (pH units) ²	Degrees of freedom	Mean square (pH units) ²	Variance ratio. <i>F</i>
<i>Between subjects</i>				
Age groups	301.25 .	7 .	43.04 .	$F = 4.53, P < 0.001$
Residual	1852.56 .	195 .	9.5003 .	—
<i>Within subjects</i>				
Sites	574.68 .	33 .	17.41 .	$F = 45.10, P < 0.001$
Sites × age groups	100.12 .	231 .	0.43 .	$F = 1.12, 0.20 > P > 0.10$
Residual	2483.70 .	6435 .	0.3860 .	—
Total	5312.31 .	6901 .	— .	—

The main reason for significant differences being detected between age groups is that the mean pH of children examined on their first day of life (6.77 ± 0.15 pH units) was significantly greater than that of any other age group. Technically the only other significant difference between age groups is that the mean of children examined on the second day was higher than those of the fifth and sixth days. Although the means for children examined on the third to eighth days of life are not significantly different, Table II does suggest a definite trend of decreasing pH from the first to fifth days followed by a slight rise from the fifth to the eighth day, this general trend being interrupted only by a slight rise on the fourth day when, in fact, a slight fall might reasonably have been expected. In all important respects this trend is very similar to that reported by Behrendt and Green (1958); like their data for three sites, ours shows the high pH of the first day and the major part of the subsequent decrease in pH appears to be between the first and second days.

TABLE II.—*Mean pH of Skin Surface by Age of Subject*
(34 determinations made at same sites on each subject).

Age (day of life).	Number of infants.	Number of determinations.	Mean pH $\pm$ standard error.
1st	12	408	6.77 $\pm$ 0.15
2nd	24	816	6.27 $\pm$ 0.11
3rd	24	816	6.03 $\pm$ 0.11
4th	28	952	6.12 $\pm$ 0.10
5th	34	1156	5.86 $\pm$ 0.09
6th	19	646	5.93 $\pm$ 0.12
7th	38	1292	6.01 $\pm$ 0.09
8th	24	816	6.06 $\pm$ 0.11
1st-8th	203	6902	6.08 $\pm$ 0.04

Moreover, the analysis of variance (Table I) shows that the interaction between age and site was not significant. Thus the trend described above for the means of all sites combined might be expected to be true for individual sites. However, for two reasons, it is prudent to examine the sites separately. First, the probability appropriate to the variance ratio for the interaction is not very high. Second, Bartlett's (1937) test suggests that the residual mean square within subjects may not be a valid estimate of error variance for testing the significance of the interaction because the eight components upon which the residual is based are not homogeneous ($P < 0.001$). Therefore we have inspected the eight age group means for each of the thirty-four sites to see if they do in fact have the same general trend as that described above for all sites combined. In discussing this inspection it will be convenient to refer to "first day mean", "second day mean", etc. Such terms indicate the mean pH of children examined on the day stated.

Thirty-three sites had first day means which were greater than those of any other day and the thirty-fourth site had a first day mean greater than any subsequent day except the second. Although the minimum significance difference likely to be detected between the first and any subsequent day was rather high (0.55-0.62 pH units) more than two thirds of the comparisons were technically significant. It is reasonable to conclude therefore that the discovery by Behrendt and Green (1958) of an excessively high pH level at three body sites on the first day of life is true of most of the body surface.

Thirty of the thirty-four sites had first day means greater than second and second day means greater than third. The four exceptions include that of the previous paragraph and three sites at which the third day mean was slightly greater than the second.

Twenty-six sites had a higher fourth day mean than third or fifth and of these twenty-one had a fifth day mean lower than the third. In six of the remaining eight sites the fifth day mean was the lowest of the first five days and in the other two the fourth day mean was the lowest.

The means for the fifth to eighth days were more difficult to examine because, as Table II shows, the mean differences between these days were very

small. Ranking these means resulted in no fewer than twelve different sequences and the only possible point of interest is that in as many as twenty-one sites the fifth and sixth day means were both less than either the seventh or eighth.

It will be appreciated that many of the differences between means for children of different ages could easily have arisen by chance and that many of those between groups differing by only one day in age cannot be clinically important. In the last few paragraphs we have drawn attention therefore to consistent trends between different sites. From these observations we think

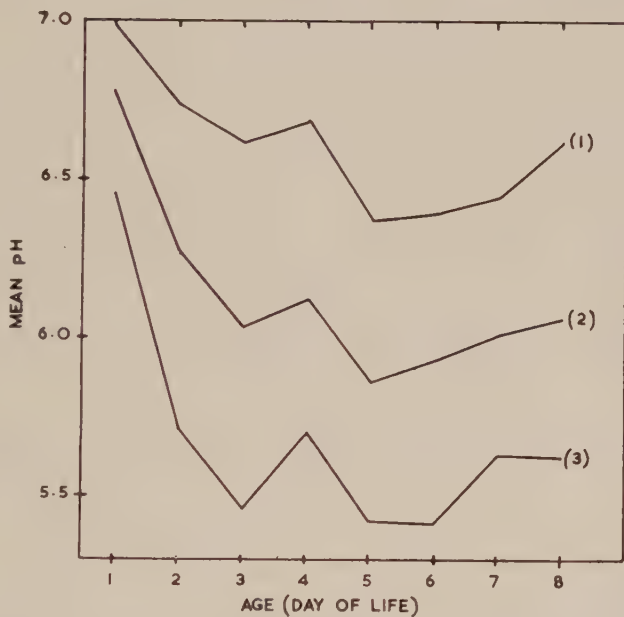


FIG. 1.—Mean pH of children of different age. (1) six most alkaline sites, (2) all sites and (3) four most acid sites.

it is reasonable to conclude that, although the level of pH differs appreciably between sites, most surfaces of the body show a fairly consistent day to day variation over the first week of life. The important features of this consistent age pattern are that on the first day of life the pH level is likely to be higher than in subsequent days, it is likely to fall sharply between the first and second days and less sharply between the second and third, on the fourth day it is likely to rise again and between the fourth and fifth a further fall is likely to occur. After the fifth day it is possible that a slight increase in pH will occur at some sites but this is not so definite as the earlier decrease and, in fact, our observations at this stage might be due to daily variation experienced by all children. This trend is depicted in Fig. 1 for all sites combined and those which we previously nominated as the most alkaline (groin, scalp and forehead) and

the most acid (dorsum of hand, elbow and upper arm extensor) (Beare *et al.*, 1959).

SUMMARY.

1. Determinations of the pH of the skin surface were made at thirty-four body sites on each of 203 normal children with a Marconi direct reading pH indicator. This experiment has been fully described by Beare *et al.* (1959), and the data have been examined in the present report for differences in mean pH between groups of children of different ages.

2. This analysis shows that over most of the surface of the body the mean pH level of children on their first day of life is significantly higher than that of children examined on any of the subsequent seven days.

3. If the variation between the means of groups of children of different age can be accepted as reflecting the variation between different ages of a single child, then the likely trend of pH levels at most sites of the body is for the high pH of the first day to fall rapidly between the first and second days, less rapidly between the second and third, to rise between the third and fourth and to fall to a minimum about the fifth day of life. After the fifth day a slight rise in pH may occur.

4. The findings of Behrendt and Green (1958) for three sites thus appear to be true of most of the body surface.

Our thanks are due to Dr. Ivan McCaw, Mrs. Dorothy Hutton and Miss Betty Thornbury for their help in this work, to the Medical Staff of the Royal Maternity Hospital, Belfast, for access to their patients and to the nursing staff of that hospital for practical help.

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THE IRRITANT EFFECT OF SOAP UPON THE NORMAL SKIN.

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ALTHOUGH there is some doubt whether the ordinary use of soap often causes damage to the normal skin (Fishbein, 1945), it is generally accepted that irritant properties may be demonstrated under appropriate conditions. Thus, patch tests made by the usual techniques with strong soap solutions give a substantial proportion of positive results. It seems likely that the irritant property shown by a patch test is produced by the same factor as irritation in ordinary usage; Kooyman and Snyder (1942) showed that the results of patch tests agree closely with those of a user test in respect of any particular soap. These patch-test reactions are of the primary irritant type and very seldom show the vesicular response characteristic of allergic epidermal hypersensitivity. The precise factor or quality of soap which is responsible for this irritant property has not been certainly identified.

ALKALINITY.

Perhaps the most widely held popular belief is that it is the alkalinity of soap which damages the skin; this view seems also to be held by many dermatologists. However, a preliminary series of 48-hour patch tests carried out by one of us with carbonate-bicarbonate buffer of pH 10·7 failed to produce any positive results. This may have been partly because the acidity of the skin was able to reduce the pH of the buffer. The patch test, according to an indicator, usually showed a pH of 9 to 9·5 when removed after 48 hours. Pillsbury and Schaffer (1939) pointed out that ordinary patch tests are not ideal for this purpose and used a glass cup fixed to the skin so as to bathe the test area in the solution throughout the experimental period. Even with this improved technique they obtained no irritant reactions with buffer solutions up to pH 12·6. These negative results may again be partly due to the power of the skin to neutralize alkali; the pH of the buffer solutions was found to be considerably reduced during the period of the test. It is true that Burekhardt (1936) obtained positive patch tests with solutions of lime, but neutralized

cement also gave positive reactions (Burckhardt, 1939). The possible neutralization of an alkaline patch test by the acid buffering of the skin applies equally to soap; Hansen (1936) found that 10% soap in contact with the skin is neutralized after seven hours—faster than the neutralization of the buffers used by Pillsbury and Schaffer. It seems probable, therefore, that the irritancy of the soap patch test is not due to its pH or at any rate to its pH alone. This agrees with Jordan *et al.* (1936) who patch-tested normal subjects with different types of soap and found no correlation between pH and the number of positive results they obtained.

NEUTRAL SOAP.

The term “neutral soap” is sometimes misleadingly used to mean a potassium or sodium soap in which no free alkali is present. But the fatty acid soaps of strong alkalies are themselves strongly alkaline in aqueous solution, mostly in the region of pH 9.5 to 10, even in the absence of free alkali. In an attempt to obtain a soap which is truly neutral in aqueous solution, weaker bases have been tried, notably triethanolamine (TEA). TEA soaps in watery solution have indeed a pH nearer to neutral. One product of this kind (Neutrogena) was subjected to a user test by Martin-Scott and Ramsay (1956) and showed much less irritancy than ordinary soap. In the present series the same brand of soap as that used by Martin-Scott and Ramsay was used in 1% and 5% aqueous solution for the standard patch test and its irritancy compared with that of ordinary soap. It should be observed, however, that although this soap has been stated by the makers to have a pH of 7.5, we found a 1% solution to have a pH of 10. (This difference may arise from differences in the method of measurement, and in the solvent used). The makers inform us that it is prepared from edible beef tallow 26%, coconut oil 15%, castor oil 11% and stearic acid 48%. It contains therefore more stearate than most soaps, but otherwise substantially the usual variety of fatty acids. Estimation of sodium in this product with the flame photometer gave a value of sodium corresponding to about 25% of sodium soap. It appears likely, therefore, that TEA soap constitutes only a proportion of this product and that quantities of ordinary sodium soap are present to account for the alkaline reaction. This means of course that the actual test concentration of sodium soap in 5% of this “neutral soap” is only a quarter of that in the 5% ordinary soap test, and if TEA soap were less irritant this difference might be expected to become discernible. TEA itself, however, is not above suspicion as an irritant. Thyresson *et al.* (1956) investigated an outbreak of dermatitis in which TEA appeared to play an important part; in every case patch tests with a hand lotion containing TEA were positive while tests made with the lotion from which TEA was omitted were negative. Also, Ray and Blank (1940) in testing ointment bases

found greater irritancy when 7% TEA was added to a base containing stearic acid and lanoline. They believe TEA stearate to be irritant.

FATTY ACIDS.

Blank (1939) has shown that patch tests with various pure fatty acids give widely different irritant reactions. In general, the fatty acids of low molecular weight are more irritant, especially caprylic and capric; oleic, myristic and palmitic were the least irritant of those tested. For any individual acid, irritancy was less if the pH were lowered. From this Blank concluded that the irritancy of soap could be attributed to a property of certain fatty acids, enhanced by alkalinity. It is well recognized in the industry that soap made from coconut oil, which contains fatty acids of low molecular weight, is more irritant than most other kinds and that the proportion of coconut oil soap in a toilet soap should not ordinarily be more than about 20%.

Blank found palmitic acid to be one of the least irritant. In the present series, tests were therefore made with 1% and 5% solutions of pure potassium palmitate, in order to compare its irritancy with that of ordinary toilet soap containing the usual proportion of fatty acids of lower molecular weight.

DETERGENCY.

Another suggested explanation of the irritant action of soap is its detergent property. It is difficult to say with precision wherein the property of detergency lies, though it is evidently related to surface action, emulsifying power and reduction of surface tension. The part played by pH in cleansing the skin is difficult to assess; there is plenty of evidence that an alkaline cleanser is more efficient for textiles and it may be that the same applies to the skin (Fishbein, 1945). Blank and Coolidge (1950) have shown that as alkalinity increases, human keratin carries an increasingly strong negative charge. Bacteria and perhaps most solid dirt particles also carry a negative charge so that they are repelled from the skin surface in the presence of alkali and their removal more readily accomplished. The removal of soluble and emulsifiable material from the skin is presumably not influenced by this consideration.

The irritancy of soap has been attributed to a defatting and consequent drying action which is sufficient alone to damage the skin. In order to test this possibility, a soapless detergent consisting chiefly of alkyl sulphates (Teepol) was used for patch tests. It is not easy to decide what concentration of Teepol should be held to have the same detergent power as soap. The concentration advised by the makers for most purposes is about 0.3 to 0.6%, whereas the concentration of soap usually used is 0.3 to 1%, though often considerably more. The test strength of 1% Teepol was chosen for patch testing, being about twice the concentration recommended by the makers for most purposes.

A further possibility is that the detergent action of soap, though not in itself harmful, may allow the penetration of alkali which then damages the skin to a degree which would not be possible if its surface layers had not already been defatted: 1% Teepol in aqueous solution gives a pH of 6.8, so tests were also made with 1% Teepol buffered to pH 10 with carbonate-bicarbonate buffer.

A further series of tests was carried out with bile salts. Bile salts lower the surface tension of water and are efficient emulsifying agents; they do not, however, appear to have been credited to any considerable extent with detergent properties: 0.1% and 1.0% aqueous solutions of bile salts were used for standard patch tests both alone and buffered to pH 10 with carbonate-bicarbonate buffer.

MATERIALS AND METHODS.

Patch Tests.

Patch tests were made with circular pieces of adhesive plaster 4.5 cm. in diameter (Dalmas No. 3). The central zone 2.5 cm. across is covered with cellophane and the test patch of white cotton lint was a square or triangle about 1 cm. across. Patch tests were applied to the normal skin of the back at about scapular level. They were removed after 48 hours and read at once. Occasionally, when difficulty arose, the reactions were examined again the next day. With few exceptions there were only two types of positive reaction: the weaker which we have recorded as $\pm$ was a faint erythema; the stronger, +, was red, slightly raised and often showing fine papules. The more exaggerated reaction recorded as ++ was uncommon and showed the same changes as +, but more marked. True vesicular responses comparable with those obtained in epidermal allergy were not seen. The results were read by one or both of us in close collaboration so as to ensure that our standards of classification remained constant. Nevertheless, we are aware that these differences of degree are arbitrary and that the difference between $\pm$ and + is not as definite as that between $\pm$ and negative.

Soap.—The ordinary toilet soap used was that supplied for use in N.H.S. hospitals in 1958. According to the makers (David Thom and Co. Ltd.) it is a toilet soap of good quality with no free alkali or builders and has a fatty acid content approximately as follows:

		%
Caprylic	. .	0.6–1.6
Capric	. .	0.6–1.4
Lauric	. .	9.6–10.4
Myristic	. .	5.0–5.5
Palmitic	. .	22.5–22.9
Stearic	. .	20.6–20.7
Palmitoleic	. .	1.7–1.7
Oleic	. .	36.2–38.2
Linoleic	. .	0.2–0.5

This is a rather lower proportion of caprylic and capric acids than that given by Lane and Blank (1942) for an average toilet soap. 1% and 5% solutions were made with distilled water: 1% solution had pH 10 and 5% had pH 9.5.

Potassium palmitate.—This was prepared from pure potassium hydroxide and palmitic acid in equimolecular proportions: 1% and 5% solutions were made with distilled water and were of pH 9.7 and pH 9.3 respectively.

Neutrogena soap.—Neutrogena soap was made into 1% and 5% solutions with distilled water: 1% solution had pH 10 and 5% solution had pH 9.8.

Teepol.—Liquid Teepol (Shell Chemical Co. Ltd.) is a 27% solution of secondary alkyl sulphate: 1% of this liquid was used for patch testing and its pH was 6.8.

Bile salt.—Purified ox-bile salt was used to make 0.1% and 1.0% solutions in distilled water. The solution had pH 5.9. Both Teepol and bile salt were also adjusted to pH 10 with carbonate-bicarbonate buffer for a parallel series of patch tests.

Subjects.

These tests were carried out on 157 subjects who had been admitted to hospital for various medical and surgical disorders unrelated to the skin.

None of them had any active or inflammatory skin eruption; those who claimed to have a sensitive skin or a dry skin were not excluded, provided it was deemed to be within normal limits. The age and sex distribution of these patients is shown in Table I.

TABLE I.—*Age and Sex of Patients Treated.*

	Age (years).							Total.
	10-19	20-29	30-39	40-49	50-59	60-69	70+	
Male . . .	1	5	7	14	19	20	6	72
Female . . .	1	9	10	17	16	19	13	85
Total . . .	2	14	17	31	35	39	19	157

RESULTS.

The results of patch tests with toilet soap are shown in Table II.

In this table the bottom horizontal row of totals gives the number of subjects who reacted in various degrees to 1% soap. In the vertical columns above each total are given the reactions of these patients when tested with 5% soap. The totals of 5% reactions are given in the vertical column on the right.

TABLE II.—*Results of Patch Tests with Toilet Soap.*

		Neg.	±	+	++	Total
Toilet soap 5%	++	6	3	11	1	21
	+	52	16	8	0	76
	±	27	3	0	0	30
	Neg.	29	0	1	0	30
Total		114	22	20	1	157
Toilet soap 1%						

From this it will be seen that at 1% strength, 114 patients gave no reaction, 22 gave ±, 20 gave + and one ++.

At 5% strength, there was a general shift to positivity; of the 114 previous negatives, 27 became ±, 52 + and 6 ++. Only 29 (18.4%) were negative to both strengths. These results are evidently not quite the same as those recorded by Jordan *et al.* (1936) or by Hansen (1936). A strict comparison is not possible because the toilet soap used was not the same and because methods of carrying out the tests and possibly of recording results were both

identical. Comparison is possible, however, with potassium palmitate tests, the results of which are shown in Table III. It is at once clear that negative

TABLE III.—*Results of Patch Tests with Potassium Palmitate.*

Pot. palmitate 5%	{	Neg.	±	+	++	Total.
		1	3	6	1	11
		23	12	10	0	45
		22	0	2	1	25
		71	3	2	0	76
Total		117	18	20	2	157
Pot. palmitate 1%						

and weak reactions are more frequent than with toilet soap and no less than 71 patients gave completely negative tests. This represents 45·2% of the total—more than double the proportion of non-reactors to toilet soap. This difference can hardly be ascribed to a very minor difference in the measured pH. It seems to substantiate Blank's view that palmitic acid is less irritant than most other fatty acids, the greater irritancy of toilet soap being due to the other fatty acids of lower molecular weight present in the mixture. If this explanation were correct we might expect Neutrogena soap to be as irritant as toilet soap since its fatty acid content is not much different, but we found it not to be so. From Table IV it will be seen that there is very little difference between potassium palmitate and Neutrogena. Out of 127 persons tested, 59 gave completely negative results, i.e. 46% of the total. Neutrogena is therefore much less irritant than toilet soap. This lesser irritancy is not due to a lower pH since the Neutrogena solution used was as alkaline as the toilet soap.

TABLE IV.—*Results of Patch Tests with Neutrogena.*

Neutrogena 5%	{	Neg.	±	+	++	Total.
		3	1	2	0	6
		25	6	6	0	37
		20	3	1	0	24
		59	1	0	0	60
Total		107	11	9	0	127
Neutrogena 1%						

This leaves the question of detergency to be considered as a source of irritation. TEA soaps are said to be less efficient detergents (Klauder *et al.*, 1940) ; Martin-Scott and Ramsay, on the other hand, seem to regard this particular soap as satisfactory in that respect. They observed, however, that washing with Neutrogena soap had little effect on the pH of the skin and on the skin-fat factor. They take this to indicate that the soap is more easily washed off the skin, but reduced detergent power seems an alternative explanation.

If the quality of detergency is alone enough to irritate, one may expect a soapless detergent to have this property. Our results with 1% Teepol are shown in Table V. It is at once very striking that 1% Teepol gave only 8 reactions in

TABLE V.—*Results of Patch Tests with Teepol.*

Teepol alkaline	{	Neg.	±	+	++	Total.
		1	0	0	0	1
		6	1	4	0	11
		8	1	0	0	9
		134	2	0	0	136
Total		149	4	4	0	157
Teepol neutral						

157 subjects, i.e. 95% failed to react to a concentration which we deem to have at least the detergent effect of 1% soap and probably more. This agrees with the findings of Kvorning and Svendsen (1956). Yet 1% toilet soap gave only 73% negatives, and 1% potassium palmitate 74%. When Teepol was alkalized to pH 10 there was a shift towards increased irritancy; 15 patients who had given no reaction to neutral Teepol gave reactions to the alkaline solution. The proportion of negative reactors was thus reduced to 85%.

Why is alkaline Teepol more irritant than neutral? It may be that alkali in some way enhances the very mild irritancy of Teepol, but it seems more feasible that Teepol increases the permeability of the outer layers of the epidermis and thus allows the alkali to exert an irritant effect which it otherwise cannot. One may here recall that Kvorning and Svendsen (1956) patch-tested sensitive subjects with chromium and nickel solutions with and without the addition of 1% Teepol. They found that when Teepol was added, positive reactions were obtained with lower concentrations of chromium and nickel, though the irritant effect of mercury bichloride was apparently not enhanced. Nilzén and Wikström (1955) observed a similar effect. They found that the sensitizing power of potassium dichromate was increased when lauryl sulphate was added to the solution applied to the skin. They suggested that this may be because lauryl sulphate increases the permeability of the skin, thus bringing the irritant dichromate into closer relation to the living epidermis. Rothman (1943) pointed out that pretreatment of the skin with lipid solvents increases transcutaneous absorption. It seems likely that alkaline Teepol owes its irritancy to a mechanism of this sort.

In comparing 1% palmitate with alkaline 1% Teepol, the greater irritancy of 1% palmitate soap is difficult explain. It can hardly be due to pH alone which is no greater than that of alkaline Teepol; nor to the palmitate moiety since Blank obtained only 3% positive reactions from patch tests with palmitic acid. Although we believe that 1% Teepol has at least an equal detergent effect, however, the property of penetrating the epidermis may not be quite

the same thing and the greater irritancy of soap may result from a more efficient penetrative effect than that possessed by Teepol.

Patch tests with 0.1% bile salt in 150 subjects gave 91% negative; when buffered to pH 10, 93% negatives were obtained (Table VI). We conclude that emulsifying power and lowering of surface tension do not enhance the irritant action of alkali.

TABLE VI.—*Results of Patch Tests with Bile Salt.*

Bile alkaline	{	Neg.	±	+	++	Total.	
		++	0	0	0	0	
		+	1	0	2	0	3
		±	7	0	0	0	7
		Neg.	129	7	4	0	140
Total		137	7	6	0	150	
Bile neutral							

It is of some interest to note by the way the influence of age and sex on the results of these soap patch tests. It was observed that positive tests were more often seen in women and more often in those under 50 years of age. From Table VII it will be seen that positive (including ±) tests were more often seen in subjects under 50 than in the older patients. The sex factor was not significant and the apparent difference arose because in this series the proportion of women in the younger group was greater than that of men.

TABLE VII.—*Proportions of Positive Reactors in Age and Sex Groups.*

	10-49 years.		50 years and over.	
	Male.	Female.	Male.	Female.
Toilet soap . . .	$\frac{23}{27}$ (85%)	$\frac{36}{39}$ (92%)	$\frac{32}{45}$ (71%)	$\frac{36}{46}$ (78%)
Pot. palmitate . . .	$\frac{18}{27}$ (67%)	$\frac{25}{39}$ (64%)	$\frac{19}{45}$ (42%)	$\frac{20}{46}$ (43%)
Neutrogena . . .	$\frac{14}{24}$ (58%)	$\frac{21}{40}$ (53%)	$\frac{11}{32}$ (34%)	$\frac{21}{41}$ (51%)

This indicates the need for caution in comparing patch-test results in different groups of patients; comparisons may not be valid unless the age distribution of the test subjects is known to be the same.

TRIETHANOLAMINE PALMITATE.

After the conclusion of the experiments described above, it was decided to carry out a series of patch tests with pure triethanolamine palmitate (TEAP). This soap would presumably lack most of the irritancy due to fatty acid and alkalinity. TEAP was prepared by mixing equimolecular proportions of TEA

and palmitic acid and strengths of 1% and 5% were prepared with distilled water. These had a pH of 8.6 and 8.7 respectively.

TABLE VIII.—*Age and Sex Distribution of Subjects Tested with TEAP.*

	Age in years.							Total.
	10-19	20-29	30-39	40-49	50-59	60-69	70+	
Male . . .	0	2	2	4	7	11	2	28
Female . . .	3	4	4	6	6	4	1	28
Total . . .	3	6	6	10	13	15	3	56

These patch tests were carried out on a fresh group of 56 patients, all of whom had normal skins. Their age and sex distribution is shown in Table VIII and the results of the tests are given in Table IX. Negative results to both test strengths were obtained in 28 subjects (50%) a result very similar to that obtained with potassium palmitate and with Neutrogena. As we have indicated, however, a strict comparison between this group and the previous one is not possible since the test subjects were not the same.

TABLE IX.—*Results of Patch Tests with TEAP.*

TEAP 5%	{	Neg.	±	+	++	Total.
		0	0	0	0	0
		7	2	1	0	10
		15	0	1	0	16
		28	1	1	0	30
Total		50	3	3	0	56
TEAP 1%						

CONCLUSION.

The results of these tests support the view of Blank that the irritancy of soaps depends in some degree upon the presence of fatty acids of lower molecular weight. We are unable to discern any irritant effect due to alkalinity. When both of these factors are eliminated, there remains an irritant property which is not simply the effect of detergency since it is not equally shown by a soapless detergent.

We suggest that this irritancy may be related to a penetrating power, an ability of soap to modify the epidermal barrier layer and thus allow solutes more easily to reach the malpighian cells and set up irritation. That soap does indeed possess this penetrating power has been demonstrated in another set of experiments (Bettley and Donaghue, 1960).

SUMMARY.

Patch tests with potassium palmitate, triethanolamine palmitate and Neutrogena soap gave fewer irritant reactions than with ordinary toilet soap.

Teepol gave fewer irritant reactions than any soap, and became somewhat more irritant when made alkaline.

Bile salt rarely gave positive reactions.

It is suggested that the irritancy of soap, though partly due to its fatty-acid content, may also depend upon its power of penetrating the epidermal barrier.

We have to thank many colleagues at the Middlesex Hospital for permission to make tests on their patients.

We are indebted to the Clinical Research Committee of the Middlesex Hospital for laboratory facilities and for a personal grant to one of us.

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ROYAL SOCIETY OF MEDICINE.

SECTION OF DERMATOLOGY.

President—Prof. JOHN T. INGRAM.

15 January 1959.

Epithelioma Adenoides Cysticum.—Dr. R. M. B. MacKENNA.

A boy, aged 7 years.

History.—1953 : Cerebellar medulloblastoma removed completely by operation.
1954 : Appearance of small pigmented papillomatous lesions on neck and axillae, with a gradual spread to groins, and an increase in total number. Lesions have persisted essentially unchanged until present. 1957 : Small papular lesion behind right ear, excised and area treated by irradiation.

Clinical Findings.

Well-developed youngster in good general health. Multiple, pigmented papillomata on neck, axillae and groins. Neurological—normal.

Investigations.

Skull x-rays—no evidence of disease.

Biopsies (a) Lesion behind right ear. (b) Axillary lesion.

Dr. T. B. FITZPATRICK : This patient has, I believe, a condition known as “basal cell nevi” which was originally described by Nomland in the United States in 1932 and more recently by Howell and Caro at a meeting of the American Dermatological Association held in Sun Valley in June 1958. The condition has the clinical appearance of epithelioma adenoides cysticum but the histological appearance is indistinguishable from basal cell carcinoma. Apparently the lesions grow very slowly but not infrequently (especially on the face) ulcerate and clinically behave like basal cell carcinoma. Last spring we saw a young girl, aged 16, with numerous (hundreds) skin-coloured or slightly pigmented papules on the upper trunk and face and assumed that the condition was indubitably an example of epithelioma adenoides cysticum. We were baffled by the histological finding of basal cell carcinoma until I heard Howell and Caro's paper at Sun Valley. Howell and Caro recommend that the lesions be removed by superficial destructive measures such as electrocautery since they consider the lesions precancerous.

Dr. GRANT PETERKIN : I believe this dermatosis has been referred to by Dr. J. B. Howell, of Dallas, Texas (J. B. Howell and M. R. Caro ; “The Basal-cell Nevus”, *Arch. Derm., Chicago*, 1959, 79, 67). I saw him six weeks ago and he told me about these cases for which he was using mainly curettage and desiccation.

THE PRESIDENT : I do not recollect having seen this before puberty. I should have thought it best to leave the lesions alone.

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Weber-Christian Disease.—Dr. M. E. EILOART (for Dr. G. B. MITCHELL-HEGGS).

A girl, aged 3 years.

Clinical History.—In April 1958 the child ran a slight temperature and developed between the shoulder blades a red, circular, indurated, flat swelling, that gradually spread centrifugally. In the next few months she seemed well, but the original lesion spread and other patches appeared on the upper arms and under the chin, associated with slight transient febrile attacks. She was observed in hospital for several weeks, many investigations were carried out, and a biopsy was taken from the original patch. She was shown for the first time at the R.S.M. in June 1958.

By October 1958 the panniculitis had spread to the cheeks ; the child had become rather miserable ; for the first time the patches seemed to be slightly tender, and she was again slightly febrile. She was readmitted to hospital and given a course of penicillin by mouth for 5 weeks. After the first week all the induration and redness disappeared from the patches, which faded and left well defined areas of fat atrophy. The child appeared to be quite fit and well.

In November 1958, two weeks after going home, she developed an acute illness with high temperature, abdominal pain, vomiting, and diarrhoea. No infective cause was found for this ; it appears to have been a spread of the panniculitis to the abdominal tissues. The condition responded quite dramatically to large doses of penicillin.

Since November no further panniculitis has developed and the child seems well. She still has her patches of fat atrophy at the original sites. She was kept on penicillin till January this year.

Investigations.

Chest skiagrams normal July and December 1958. Serum electrophoresis normal July 1958. Urine and throat swabs normal July and December 1958. Blood ESR 7, Hb 86%, WBC 8000, July 1958; ESR 10, WBC 7000, December 1958. Liver function tests normal July 1958 and January 1959.

Biopsy.—There is round-cell infiltration in the fatty layer, particularly round the hair follicles.

Dr. L. FORMAN : There seems to be a central abscess in the middle of the back and a very large collection of polymorphs and one can understand why penicillin has worked so well. I think Dr. Schwartz had a similar patient, an adult, whose lesions were well controlled with penicillin.

THE PRESIDENT : There have been cases of lipodystrophy described with lupus erythematosus. I showed one at Leeds last year. Would there be any association between the Weber-Christian reaction and the lupus profundus reaction ?

Dr. M. FEIWEL : I think Dr. Scott showed a similar case several years ago.

Dr. O. L. S. SCOTT : I think Dr. Schwartz treated his case with chloramphenicol and she did very well. Our case did not improve (Wigley and Scott, 1952). She had steatorrhoea which we thought might have been caused by lymphatic involvement as in Whipple's intestinal lipodystrophy. She died of a coronary thrombosis and there was no post-mortem.

WIGLEY, J. E. M. and SCOTT, O. L. S. (1952) *Proc. R. Soc. Med.*, **45**, 464.

The following cases have been published in *Proc. R. Soc. Med.* **52**, 553.

Sturge-Kalischer-Weber Syndrome (Encephalo-trigeminal Angiomatosis).

—Dr. PETER BORRIE.

Staphylococcal Granuloma, Rosacea, Uveitis and Conjunctival Cicatrization.—Dr. PETER BORRIE and Mr. BARRIE JONES.

Pituitary Exophthalmos. ? Sarcoidosis.—Dr. B. BARLING and Dr. M. FEIWEL.

The following cases were also shown.

Punctate Keratosis of Palms and Soles.—Dr. M. A. SMITH (for Dr. R. M. B. MacKENNA).

Kaposi's Haemorrhagic Sarcoma.—Dr. R. M. B. MacKENNA.

Two Cases of Folliculitis Ulerythematosia Reticulata.—Dr. S. P. HALL-SMITH.

Sulphonamide Rash with Nephritis.—Dr. A. J. LANE (for Dr. R. J. HARRISON).

Keloid Scar following Jelly-fish Sting.—Dr. E. CRONIN (for Dr. H. J. WALLACE).

Dr. C. H. Whittle read a paper entitled:

Experimental Paronychia: Host-parasite Relationship.

19 February 1959.

Granuloma of Face.—Dr. D. I. WILLIAMS.

A man, aged 47 years. Motor driver.

History.—This patient has had swellings on the right of the forehead and over the right parotid gland region for the past twenty-five years. The colour of the skin overlying the tumours varies from bluish to pink and the swellings fluctuate in size. During the past year he has noticed some loss of weight and energy.

Past History.—Bronchial asthma since the age of 21. Pneumonia on three occasions. Gastric ulcer.

Family History.—Asthma and eczema.

Clinical Findings.

There is a pale mauve intracutaneous sausage-shaped swelling of rubbery consistency and freely mobile over the deep structures, situated over the right parotid region. A smaller similar lesion, although harder in consistency, is present on the right side of the forehead.

Apart from some enlargement of the axillary, inguinal, right deep cervical and right epitrochlear glands, there is no abnormality on systemic examination. The blood pressure is 135/90.

Investigations.

Haemoglobin: 98%.

Total white blood count: 9000 per cm. : Neutrophils 40%, Eosinophils 28%, Lymphocytes 26%, Monocytes 6%.

Serum proteins : (a) 6.7 g./100 ml. Normal electrophoretic pattern (King's College Hospital).

(b) *Serum total proteins :* 6.8 g./100 ml., albumin 3.3 g., globulin 3.5 g., A : G = 0.95, increase in alpha 2 and gamma globulins. (Bolingbroke Hospital.)

E.S.R.: 13 mm. (Wintrobe) ; 65 mm. (Westergren).

L.E. cells: Not found in peripheral blood.

Chest skiagram: "Old tent-shaped adhesion of left diaphragm. Small area of fibrosis and calcification of right upper perihilar region. No evidence of recent pulmonary infiltration."

Sialogram: "Parotid duct normal. Soft tissue swelling is external to parotid gland."

Bone marrow: No myeloma cells.

Mantoux 1/10000: Negative.

Right axillary gland biopsy: "Reactive hyperplasia."

Skin biopsy, right parotid region (Professor H. A. Magnus): "The epidermis is normal. Scattered throughout the dermis and going to a considerable depth there are focal proliferations of reticuloendothelial cells, a few of which are multi-nucleate. Around these foci there is a very marked infiltration with eosinophils and lymphocytes. There is perhaps some increase in fibrous tissue.

Treatment: Bismuth injections, anti-malarials, gold, steroids, radiotherapy. All with no effect.

Dr. D. I. WILLIAMS : When I first saw this case in 1948 I did not know what it was and eleven years later I still do not know. The patient has had lesions on the forehead and over the right parotid for twenty-four to twenty-five years. These wax and wane, and to-day they have waned, being half the size that they were yesterday. A recent development is enlargement of the lymph glands with, histologically, only reactive hyperplasia. The patient is an asthmatic. His E.S.R. (Westergren)—63 mm.—is high : the Wintrobe reading is 13 mm. No L.E. cells have been found in the peripheral blood. The bone marrow is normal. Skiagrams of the skull and long bones are quite normal.

One possible clinical diagnosis—sarcoid—is not supported by the histology. Speigler-Fendt sarcoid is an outmoded entity. Lupus erythematosus profundus had been the suggested diagnosis in 1951 when the case was presented here, but is not tenable because of the histology. A section shows not only a number of lymphocytes but also eosinophils. There is, however, no evidence of eosinophilic xanthomatosis. It does not look like eosinophilic granuloma of the face. I am reduced to thinking of it as a pre-lymphomatous condition but I am not happy about this idea.

Dr. H. HABER: The patient shows a slightly lichenified lesion clinically. The histology reveals a reactive lymphocytoma. There is lymphoreticular tissue with lymph node structure, the reactive centre of which exhibits phagocytosis. In addition to this there is a quite considerable amount of eosinophils demonstrable. I think the lesion is benign. The tissue eosinophilia can be explained by the patient's make-up as he is an asthmatic.

Dr. WELLS described a clinically similar condition which also had no name. This was in a woman who had had the lesions for two years. It was noticeable that they were softer than one expected. One was removed surgically.

Dr. H. HABER: The case Dr. Wells is referring to is quite different. His patient has been developing for quite a number of years multiple tumours on the scalp. The histology shows lymphoreticular tissue with lymph node arrangement. The centres consist of pale reticular cells with no evidence of phagocytosis. The lesion is progressive and one cannot foretell what is going to happen to the patient.

Dr. F. F. HELLIER: The histology appears to me very like that of a lymphocytoma showing massive lymphocytic infiltrate with typical germ centres. This condition is probably a tissue reaction and not a true neoplasm and this would account for the waxing and waning of the eruption in the present case.

The PRESIDENT: This might be an old eosinophilic granuloma. Patients do present with solitary tumours of the skin in reticuloses and which do not respond normally to radiotherapy. I have watched patients for ten to fifteen years without further evidence of disease developing. However, Dr. Haber and Dr. Hellier are probably right in saying this is a reactive lesion, plus eosinophilia due to the make-up of the patient.

Extensive Cutaneous Pigmentary Naevus.—Dr. I. SARKANY, (for Dr. D. I. WILLIAMS,

A 3½ months old girl.

History and clinical findings.

This baby was born with an extensive confluent brown-black hyperpigmentation covering the bathing trunk area, the lower part of the back and the thighs. There are also numerous minimally raised, sharply outlined, light brown and brownish-black discs of varying sizes over all the other parts of the body. A lobulated, soft swelling, possibly a neurofibroma or hamartoma, arises from the right buttock and the sacral region, and a smaller similar lesion is present on the left side. A cavernous haemangioma, the size of a cherry, is on the left parietal region of the scalp, a superficial haemangioma on the forehead and Unna's naevus in the nuchal region. The eyes and fundi show no definite abnormality.

The baby has a twin brother who is normal. There is no history of consanguinity in the parents.

Investigations.

Skiagrams of the skull and spine: N.A.D.

Biopsy from right buttock: The section shows extensive junctional changes with groups of melanoblasts scattered along the basal portion of the epidermis. Many of the epithelial cells throughout the thickness of the epidermis have taken up melanin pigment.

Numerous melanoblasts and melanophores containing large amounts of pigment are scattered throughout the dermis.

Comment.

A similar case associated with neurofibroma was shown by Lieberthal (1943).

In addition to the obvious cosmetic implications, there is a possibility of involvement of the leptomeninges in extensive pigmentary cutaneous naevi (Netherton,

1936). Malignant melanoma has also been reported to arise from hairy bathing trunk naevi (Wile, 1943).

REFERENCES.

- LIEBERTHAL, E. P. (1943) *Arch. Derm. Syph., Chicago*, **47**, 264.
 NETHERTON, E. N. (1936) *Ibid.*, **33**, 238.
 WILE, UDO J. (1943) *Ibid.*, **47**, 264.

Dr. M. FEIWEL: Over ten years ago we had a young boy with a very large pigmented mole. An area on the back became inflamed and ulcerated. There was gross regional lymphadenopathy in one axilla. A biopsy showed the glands to be black and histologically Prof. Newcomb and the late Dr. Freudenthal considered that they contained malignant melanoma. However, the mass of glands subsided with radiotherapy and the lesion on the back healed. The child remained well. Some years later, surprised at the apparent response to x-rays, I asked a surgeon to re-explore the axilla. No trace of malignant melanoma was found. The boy is now grown up and quite well.

The question arises whether large amounts of pigment carried by melanophores to regional lymph nodes may lead to a mistaken sinister diagnosis. This point has also been recently discussed in the literature (Patterson, 1959).

PATTERSON, T. J. S. (1959) *Brit. J. Surg.*, **46**, 418.

The PRESIDENT: I have certainly seen a malignant melanoma arise after a plastic operation at the edge of the graft with ultimate death of the patient. It would be unwise to interfere surgically.

? Dermatofibrosarcoma.—Dr. E. WILSON JONES and Dr. H. J. WALLACE.

A woman aged 28.

History.—The patient has had a tender red mark above her right ear as long as she can remember. For the past four months the lesion has become exquisitely tender to the touch, and she has also had spontaneous pain from it. The pain is aggravated by cold, and some relief can be obtained by applying pressure to the area, and also by compressing the temporal artery on the same side.

On examination.—A tender erythematous macule above the right ear of approximately 1 in. in diameter. The border is gyrate in outline, and is of a deeper colour. The lower part of the lesion is slightly raised.

On examining the rest of the skin no abnormality is found, apart from a café-au-lait mark and a histiocytoma, both on the right leg.

Histology shows that the deep zones of the dermis are replaced by abnormal and dense fibrous tissue. It appears to be extending into the underlying fat. No glomus tissue was demonstrated.

DISCUSSION.

Dr. E. WILSON JONES: An interesting finding was that the pain tended to be partially controlled by compressing the temporal artery on the same side. Von Recklinghausen's disease was suggested.

Dr. L. FORMAN: Although the lesion was very tender to touch, it appears to be a connective tissue naevus.

The PRESIDENT: I think this is a connective tissue naevus.

The following cases have been published in *Proc. R. Soc. Med.* **52**, 555.

Sarcoid following Injury.—Dr. I. SARKANY (for Dr. R. H. MARTIN).

Disseminated Lupus Erythematosus.—Dr. H. T. H. WILSON.

The following cases were also shown.

Reticulosis (Lymphosarcoma).—Dr. R. H. CHAMPION and Dr. C. H. WHITTLE.

Sarcoidosis.—Dr. Z. Chamberlain (for Dr. G. B. MITCHELL-HEGGS).

Tinea Versicolor and Onychomycosis.—Dr. R. H. MARTEN.

Haemochromatosis and Systematized Linear Epidermal Naevus.—Dr. L. FORMAN and Dr. A. C. HAMPSON.

1. Systemic Lupus Erythematosus with Subcutaneous Nodules. 2. Sub-acute Panniculitis.—Dr. R. J. CAIRNS.

1. *Trichophyton rubrum* Infection Treated with Oral Griseofulvin.—Dr. I. SARKANY (for Dr. D. I. WILLIAMS).

Erythema Gydatum Repens.—Dr. S. C. GOLD.

Early Mycosis Fungoides: Squamous Carcinoma of the Hand.—Dr. A. SCOTT (for Dr. R. M. B. MacKENNA).

OBITUARY.

PROFESSOR H. R. HAXTHAUSEN.

DERMATOLOGISTS throughout the world will have learned with deep regret of the untimely death of Professor Haxthausen on 18 September 1959, at the age of sixty-seven.

He will always be remembered by his British colleagues not only for his great renown but also for more personal reasons. They first met him in 1927, four years before he became Professor of Dermatology and Venereology in the University of Copenhagen. He visited London on that occasion to give the Annual Oration of the London Dermatological Society, shortly to become the St. John's Hospital



Dermatological Society. The small body of members of the Society met for the Oration in a small lecture room in the old St. John's Hospital in Leicester Square and afterwards dined in a private room in one of the local restaurants. The occasion is vividly memorable for the clarity of the talk and the personal impact of the comparatively youthful speaker on his audience. The paper, published in the *Lancet* under the title "Streptococcal pityriasis", was light compared with the many weighty contributions which were to follow, but it described some personal work in simple terms and in excellent English and it was very acceptable. It is interesting to look back on because it illustrated the pattern of subsequent works. Always or nearly always these have been the outcome of some personal experimental work, much of it of great originality and importance. Altogether Professor Haxthausen published

some 130 articles, eight of them in British journals, and two books, a textbook in Danish for students and the well known and widely read monograph in English on "Cold in relation to diseases of the skin". In 1935 "Foreign protein as an auxiliary factor in cutaneous allergy towards mercurial salts and other non-antigenic substances" was the subject of a paper given at the IXth Congress of Dermatology at Budapest and it was regarded as a landmark at the time. In 1939 his first observations appeared on the "Pathogenesis of allergic eczema elucidated by experimental sensitisation with dinitrochlorbenzene". The year 1947 produced two outstanding contributions. "Studies on the pathogenesis of morphea, vitiligo and acrodermatitis atrophicans by means of transplantation experiments" and "Studies on the role of the lymphocytes as 'transmitters' of the hypersensitivity in allergic eczema". There followed in 1951 three further major contributions to knowledge of the pathogenesis of allergic eczema. "Lymph node response to cutaneous sensitisation with dinitrochlorbenzene", "Pathogenesis of allergic eczema illustrated by transplantation experiments", and "Passive transmission of dinitrochlorbenzene allergy with cells of sensitised guinea pigs". The last British publication was the entrancing Prosser White Oration of 1951 on "How are dermatological diagnoses made?" It is highly improbable that any dermatologist will ever in the future be invited to deliver the Annual Oration of the St. John's Society both early and late in his career.

During Professor Haxthausen's reign, the State Hospital in Copenhagen became a Mecca for travelling dermatologists from all parts of the world. Some British travellers who had the good fortune to meet him in his own home discovered without astonishment that he had wide and admirable gifts quite outside the range of his professional work. He was, for example, a talented musician and by contrast an athlete and a leader in the promotion of physical culture among the young of his nation. He never wore his heart on his sleeve but without question he felt some kinship with the British, a feeling which on this side was warmly appreciated and returned.

G. B. D.

ANNOUNCEMENT.

THE AMERICAN DERMATOLOGICAL ASSOCIATION, INC., ANNUAL ESSAY CONTEST.

THE AMERICAN Dermatological Association is again offering awards for the best essays submitted for original work, not previously published, relative to some fundamental aspect of dermatology, or syphilology. The purpose of this contest is to stimulate investigators to original work in these fields. Two cash awards are available as follows: One thousand dollars for first place and four hundred dollars for second place.

Manuscripts typed in English with double spacing and ample margins as for publication, together with illustrations, charts and tables, all of which must be in quintuplicate are to be submitted not later than November 1, 1960.

The manuscripts should be sent to Dr. Wiley M. Sams, Secretary, American Dermatological Association, 308 Ingraham Building, Miami, 32, Florida. Those which are incomplete in any of the above respects will not be considered. Manuscripts should be limited to ten thousand words, or less. In order to aid fair judgment, papers should be submitted under a *nom de plume* with no information anywhere in the paper as to the institution or clinic where the work was done. Along with the paper by "John Smith," for example, a plain sealed envelope, bearing the *nom de plume*, plus the full name and address of the author, is also submitted. Only after all the papers have been judged and returned to the Chairman are the sealed envelopes opened and the winners known.

Competition in this contest is open to scientists generally—not exclusively to physicians. Members of the American Dermatological Association are not eligible.

The awards will be made by the Research Aid Committee of the American Dermatological Association and its decision shall be final. The essays are judged on the following considerations: (1) originality of ideas; (2) potential importance of the work; (3) experimental methods and use of controls; (4) evaluation of results; (5) clarity of presentation. This contest is planned as an annual one, but if in any year, at the discretion of the Committee, no paper worthy of an award is offered, the awards will be omitted.

The results will be announced prior to January 1, 1961. Essays receiving first and second places are the exclusive property of the American Dermatological Association; those not winning an award remain the property of the authors and will be returned.

The candidate winning a first award may be invited to present his paper before the annual meeting of the American Dermatological Association with expenses paid, in addition to the one thousand dollar award. The time allowed for presentation of the winning essay shall not exceed thirty minutes. Further information regarding this essay contest may be obtained by writing to the Secretary of the American Dermatological Association.

BOOK REVIEWS.

MODERN DERMATOLOGICAL THERAPY.*

DURING recent years, the Californian school of dermatologists has rapidly forged to the front, and now is one of the leaders in the U.S.A. in the production of original work in our subject. This handbook is written by physicians on the staff of University College (Los Angeles) and of the University of Southern California, with the addition of chapters by Rudolf Baer and Walter Shelley, and is based on a series of conferences sponsored by the Division of Postgraduate Education, U.C. (L.A.).

A wide net is spread to cover a considerable number of dermatoses in the twenty-six chapters, though, as the Editors state, certain diseases have been omitted, because of the limitations imposed by the symposium and by publication. Owing perhaps to personal prejudices, the reviewer most enjoyed the papers on lupus erythematosus, light eruptions, pigmentation, the treatment of psychocutaneous disorders, seborrhoeic dermatitis, occupational dermatoses and atopic eczema, but in each chapter was found something to stimulate thought.

Although the book has been published this year, advances in treatment have already made certain chapters appear out-of-date. For instance, in the discussion of superficial fungus infections, there is no mention of griseofulvin; there is no reference among the cortico-steroids to dexamethazone, though the treatment of psoriasis with triamcinolone and aminopterin is discussed; and recent American work on the chelating agents in scleroderma is not commented on. The book is well bound and printed, with only a few minor spelling errors and a sprinkling of words that seem alien to a British eye. Those who like plenty of photographs will find none here but none are necessary, and there are excellent lists of references. In this volume, the British dermatologist will find much to interest him, and much to discuss, though he may disagree with some statements and find it impossible to obtain many of the proprietary remedies named.

G. A. G. P.

ALLERGY.†

LIKE so many of these books in which sections are written by different authors, it is very difficult to read as a whole and there are good and bad parts.

The dermatologist is perhaps most interested in the chapters on "Allergic Diseases of the Skin" by E. Sidi and J. Bourgeois-Spinasse, and "Urticaria and Angio-neurotic Oedema" by W. J. Quarles van Ufford. Both are useful reviews of the subjects, but are far too short to form works of reference, and there are curious omissions as for example, plant contact dermatitis is scarcely referred to.

In the chapter on "Allergy of Infancy and Childhood", A. W. Frankland does not discuss skin disorders.

The book might be useful to dermatologists wishing to refer to other fields of allergy, and the chapter by D. A. Williams gives some useful facts on prevalence, predisposing and contributory factors.

R. P. W.

* *Modern Dermatologic Therapy*. Edited by THOMAS H. STERNBERG and VICTOR D. NEWCOMER (1959). London: McGraw-Hill. Pp. 520. Price 77s. 6d.

† *International Textbook of Allergy*. J. M. JAMAR (1959). Oxford: Blackwell Scientific Publications.

CURRENT LITERATURE

THE TREATMENT OF BLACK HAIRY TONGUE WITH DEQUALINIUM CHLORIDE. C. R. STOCKDALE and L. L. BANKS. (1959) *Practitioner*, **182**, 215.

Neurotrophic disturbances, chemical irritation, parasitic organisms or drugs have been suggested as causative factors in black hairy tongue.

Details are given of four cases that responded satisfactorily to local treatment with dequalinium chloride. R. J. C.

LETHAL BULLOUS CONGENITAL ICHTHYOSIFORM ERYTHRODERMIA. S. LAPIÈRE. (1958) *Ann. Derm. Syph., Paris*, **84**, 5.

The author believes that congenital ichthyosiform erythrodermia can be divided into two distinct entities—one with and the other without bullae. Either may occur in a lethal form or in less severe types. He describes a family with the bullous type running through 4 generations as a dominant and gives the first fully documented report of a lethal case. In this the skin was not shed in bullae but in vast sheets, and the infant looked as if it had been plunged in a bath of boiling water. The appearances were very different from the harlequin foetus, the lethal representative of the non-bullous series in which the child looks as if it were covered with dried glue. Histologically there is a characteristic vesicular degeneration of the upper layers of the prickle cells. This may be found sometimes in patients not showing actual bullae which are mild examples of the bullous type; such cases may explain some of the intermediate forms that have been described and have led many writers to deny the distinction between the two groups.

F. F. H.

GRANULOMATOSIS DISCIFORMIS CHRONICA ET PROGRESSIVA. FR. WORINGER and M. A. ULLMO. (1958) *Ann. Derm. Syph., Paris*, **84**, 22.

This is an account of the first case reported in France with a careful study of the histology. The authors believe that the condition should be considered a separate anato-clinical entity, to be grouped with diseases due to metabolic troubles in which some endogenous substance is liberated that stimulates a foreign body granuloma.

F. F. H.

DEEP NODULAR LESIONS OCCURRING IN A PATIENT WITH FATAL ACUTE LUPUS ERYTHEMATOSUS. X. VILANOVA and J. PINOL. (1958) *Ann. Derm. Syph., Paris*, **84**, 37.

A woman aged 44 suffering from a fatal acute lupus erythematosus developed on two occasions small firm nodules on the chest and arms. Histological examination of a four-day-old nodule showed oedema and fibroblastic proliferation in the corium with fibrinoid degeneration and perivascular infiltration.

F. F. H.

THE ACTINIC SENSITOMETER IN DERMATOLOGY. J. MEYER. (1958) *Ann. Derm. Syph. Paris*, **84**, 45.

The author describes a simple apparatus for producing graduated exposure of the skin to light. The reaction of normal people to light and the use of the instrument in therapy and research are discussed.

F. F. H.

MUCOSAL MYELINATED NEUROMATA SITUATED IN THE MID-LINE OF THE FACE AND IN THE LARYNX. A. BAZEX and A. DUPRE. (1958) *Ann. Derm. Syph., Paris*, **85**, 613.

A boy aged thirteen developed swellings of the centre of the lips and tongue with voice changes at two months of age. At four years old a little tumour appeared on the left eyelid. When seen the centre of each lip was swollen and protruding with irregular painless nodules. Similar lesions orange and translucent were present on the tongue especially near the point and also inside the nostrils and in the larynx. Histologically these were made up of bundles of myelinated nerve fibres. The authors discuss fully the types and classification of tumours of nervous origin arising in the skin.

F. F. H.

THE ROLE OF CERVICAL ARTHRITIS IN CAUSING SOME CASES OF OCCIPITAL ALOPECIA.J. MARGAROT and P. RIMBAUD. (1958) *Ann. Derm. Syph., Paris*, 85, 609.

The authors state that sympathetic abnormalities including particularly weakness of vasodilator reactions and even at times permanent vasoconstriction are constantly found in areas of alopecia; this is confirmed by capillaroscopy. They believe such changes can be brought about by irritation of the posterior branches of the upper cervical nerves, by arthritis of the cervical spine.

F. F. H.

THE TREATMENT OF ELEPHANTIASIS WITH HYALURONIDASE. S. BORELLI. (1959)*Derm. Wschr.*, 139, 5.

Unilateral swelling of one leg in a woman aged 24, present from birth, was treated by infiltration with hyaluronidase over a period of 3½ months. The satisfactory therapeutic response was still evident 2 years later.

W. G. T.

IMPROVED CULTURE OF DERMATOPHYTES BY THE USE OF CYCLOHEXIMIDE-POTASSIUM TELLURITE SELECTIVE MEDIA AND IMMEDIATE INOCULATION OF CULTURE MATERIAL. H. GÖTZ and E. M. HERTLEIN. (1959) *Derm. Wschr.*, 139, 8.

A medium containing a combination of cycloheximide and potassium tellurite yielded the greatest number of positive results and also the greatest number of pure cultures. Most cultures developed free from contamination. It was found that the number of positive results was greatest after immediate inoculation of the media and got poorer the longer this was delayed. Differentiation showed a predominance of *T. rubrum* (61%) which is in accordance with the universal experience that this infection is on the increase.

W. G. T.

ON THE EFFICACY OF A CARBOL-FUCHSIN FREE "CASTELLANI'S PAINT". W. HÖFS. (1959) *Derm. Wschr.*, 139, 25.

The fungistatic action of the various constituents of Castellani's paint was tested and it was found that carbol-fuchsin had virtually none and can therefore be omitted from the preparation with impunity. The question of a bacteriostatic function of the dye was not gone into but it is admitted that such function may be of value, though there is no reason why a colourless bacteriostatic agent should not be substituted for the dye which has definite disadvantages.

W. G. T.

METASTATIC COLLOID CARCINOMA OF THE SKIN. L. SZODORAY. (1959) *Derm. Wschr.*, 139, 54.

Metastatic tumours of the skin from primaries in internal organs are rare. The author reports secondary deposits in the skin of the neck from a colloid carcinoma of the stomach. The appearance of the skin deposit was in part at least that of localized myxoedema. A subsequent laparotomy did not reveal the presence of internal metastases.

W. G. T.

CONSERVATIVE AND PROTECTIVE SKIN HYGIENE IN INDUSTRY. W. SCHNEIDER, M. HUBER and W. POPP. (1959) *Berufsdermatosen*, 7, 1.

Any action to prevent skin damage in industry must depend very largely on the full co-operation of the employees. Since men and women engaged in industry have become increasingly more conscious of the appearance of their hands the introduction of cosmetic hand creams was thought to be of greater appeal than a purely protective cream.

Those working in two large industrial undertakings were issued with a glycerine emulsion which afforded a considerable protection against wear and tear and also against contact dermatitis in the majority of cases. The additional use of a barrier cream is essential however in those using cutting oil, brake fluid, varnishes and solvents.

W. G. T.

OCCUPATIONAL PHENOTHIAZINE DERIVATIVE DERMATOSES. H. IPPEN. (1959) *Berufsdermatosen*, 7, 12.

Phenothiazine derivatives are finding an increasing use in medicine for a variety of purposes and the number of skin reactions reported in those having professional contact with these drugs is steadily rising. The drugs mainly responsible for these manifestations are promazine, promethazine and chlorpromazine. The reactions encountered include exanthemata, photosensitization, dermatitis and photoallergy. Skin tests are often negative, sometimes only weakly

positive and the importance of subsequent irradiation of the tested area in order to obtain a positive result is stressed.

Avoidance of contact is the only certain way of treatment. Women appear to be affected more often and it is suggested that male personnel should handle these drugs. Desensitization has not been effective. Treatment with vitamins and chloroquine has sometimes enabled sufferers to continue their employment.

W. G. T.

OCCUPATIONAL SPOROTRICHOSIS IN POTTERIES. F. GONZÁLES BENAVIDES. (1959) *Berufsdermatosen*, 7, 22.

In 1952 a number of cases of sporotrichosis were observed in potteries in Mexico. The origin of these cases could be traced in all instances to the use of Zacate grass for packing purposes. The introduction of alternative packing materials in the potteries investigated had resulted in a disappearance of the disease in 1957.

W. G. T.

OCCUPATIONAL DERMATOSES CAUSED BY GRUBS OF *PLODIA INTERPUNCTELLA*. A. GROSDANOV. (1959) *Berufsdermatosen*, 7, 30.

Occupational dermatoses had been observed sporadically in those dealing with worm-eaten nuts.

There was an increase of these cases in Bulgaria during the summer of 1954. After a few weeks the incidence declined only to increase again towards the end of that year when further wormy nuts were handled. The total incidence of symptoms amounted to 39% of those employed.

The suspected allergens were the grubs or their excreta. Tests were carried out with watery solutions of excreta, acetone and alcohol extracts of excreta and alcoholic extracts of grubs.

The large number of positive skin reactions obtained and the negative results in controls prove an allergic origin of this manifestation. The largest number of positive results were obtained with the water solution of excreta, followed by the acetone extract, the alcoholic extract and lastly the alcoholic extract of the grubs themselves.

Similar manifestation have been observed in those handling dried fruit and vegetables.

W. G. T.

CROSS-SENSITIZATION IN DIVERSE POISONOUS MEMBERS OF THE SUMAC FAMILY. J. B. HOWELL. (1959) *J. invest. Derm.*, 32, 21.

This worker confirmed the earlier findings of Shelmire that there is a cross sensitivity between ivy-sensitive patients and poison oak, and poison sumac. In addition he found these patients frequently reacted to Bhilawanut oleoresin, Bhilawanut nut shell liquid, and the oleoresin of the Japanese lacquer tree. 3-pentadecylcatechol in a 0.1% solution was too dilute to demonstrate sensitivity to poison ivy.

A. J.

RATE OF SEBUM EXCRETION FROM THE GLANDS TO THE SKIN SURFACE. KIMIO IKAI. (1959) *J. invest. Derm.*, 32, 27.

This author developed a method for the simultaneous estimation of sweat and surface sebum. The sweat was estimated by the iodine-starch reaction, and the sebum by osmic acid vapour. The conclusions drawn from these investigations are difficult to interpret; but the author states that no "parallelism" was found between the amount of sebum excreted and that of perspiration. This is not surprising as these secretory structures are activated by different mechanisms.

A. J.

DISTRIBUTION OF LIPIDS AND FREE AMINO ACIDS IN PSORIATIC SCALE. H. H. CORNISH, W. D. BLOCK and W. A. LEA. (1959) *J. invest. Derm.*, 32, 43.

Scales collected from psoriatic patients were examined for their lipid and cholesterol content, and their amino acid composition was compared with the scales obtained after an ultra-violet light reaction in a normal individual. Fifteen free amino acids were detected and these were found to be similar to those of the post ultra-violet irradiation scale.

A. J.

CHEMICAL COMPOSITION OF HUMAN EPIDERMAL LIPIDS. R. P. REINERTSON and V. R. WHEATLEY. (1959) *J. invest. Derm.*, 32, 49.

Skin samples obtained from 23 cadavers and 16 volunteers were examined for lipids and sterols. They were able to confirm the findings of Kooyman that there is a reduction of phospholipids during keratinization, and they also found as did Snider and his co-workers that choline is re-

moved and broken down from phospholipids during keratin formation. They found considerable amounts of 7 dehydrocholesterol (provitamin D₃) in the epidermis. Total fatty acids are significantly less in the epidermal cells compared with the keratin layer. A. J.

FURTHER OBSERVATIONS ON AMINOPTERIN FOR PSORIASIS. B. R. REES and J. H. BENNETT. (1959) *J. invest. Derm.*, **32**, 61.

These authors report further clinical trials with this cytotoxic drug. As only 9% enjoyed remissions of more than 12 months, and as the writers point out, this small percentage may well be the number of spontaneous remissions to be expected, it is hardly worthwhile exposing psoriatic patients to this dangerous form of therapy. A. J.

SUBCORNEAL PUSTULAR DERMATOSIS. S. BARSKY and T. CORNBLEET. (1959) *J. invest. Derm.*, **32**, 69.

Two cases of this disorder are reported; both responded to sulphonamides. The authors consider this condition to be a clinical entity. However, the fact that these cases often respond promptly to sulphonamides or dapsone makes one wonder whether these are not variants of dermatitis herpetiformis. Sometimes in addition to the superficial pustular lesions there are blisters closely resembling those of classical Dühring's disease. Perhaps a careful histological study of several lesions from the same patients would help to answer this question. A. J.

DISSOCIATION OF GRANULATION AND EPITHELIZATION IN WOUNDS OF RABBITS BY MEANS OF TOPICALLY APPLIED HYDROCORTISONE. S. H. BOULAS. (1959) *J. invest. Derm.*, **32**, 75.

It has been shown that the local application of hydrocortisone inhibited the formation of granulation tissue, but the author states that this treatment did not prevent the growth of epidermis over the wound. Nevertheless there was a delay of about 7 days in the re-epithelization of the base of the wound in the hydrocortisone animals compared with controls. The epithelial regrowth in the treated animals grew over the floor of the wound without any intervening granulation tissue. A. J.

TYPES OF KERATINIZATION IN THE HUMAN GINGIVA. J. P. WEINMANN and J. MEYER. (1959) *J. invest. Derm.*, **32**, 87.

These writers describe a state of keratinization of the gums which they term incomplete parakeratosis. This they claim is a previously unrecognized type of keratinization. A. J.

RADIOIODINE CLEARANCE FROM THE SKIN IN CERTAIN CUTANEOUS CIRCULATORY DISORDERS. E. A. FAIRBURN. (1959) *J. invest. Derm.*, **32**, 95.

The skin flows in cases of rosacea and erythrocyanosis have been compared with normal face and leg flows. There was an increased skin flow in rosacea patients, and a decreased flow in the legs of patients with erythrocyanosis. The author states there were wide variations both in the control and in the affected groups. However he did not control the ambient temperature at which the determinations were carried out and it is well known that temperature has a marked effect on the skin blood flow. Other workers have made their determinations at maximum flow by artificially warming the skin to a known temperature. A. J.

PENTOSE IN HORNY LAYERS. P. FLESCHE and E. C. J. ESODA. (1959) *J. invest. Derm.*, **32**, 437.

These authors have analysed psoriatic scales for their pentose and desoxyribose content, and have compared the results with those obtained from normal callus. In psoriatic scales they found an increase in both. It is likely that the desoxyribose and probably the other pentoses are derived from the nuclear remains present in the parakeratotic keratin, and in this respect their findings are to be expected. On the basis of this high pentose content they suggest a colour reaction for the diagnosis of psoriasis using aniline phthalate. However the test is rather complex and few clinical dermatologists have difficulty in making the diagnosis of psoriasis. The conditions that are likely to be clinically confused with psoriasis often have a parakeratotic keratin, and therefore this test would probably be valueless. A. J.